

Renewable capacity highlights

27 March 2024

HEADLINE FIGURES

3 870 GW

Global renewable power capacity at the end of 2023

13.9%

Growth in renewable capacity during 2023

473 GW

Net increase in global renewable power capacity in 2023

69%

Share of new renewable capacity installed in Asia in 2023

98%

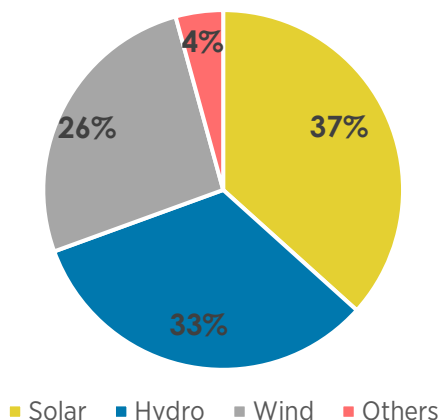
Wind and solar share of new renewable capacity in 2023

86%

Share of renewables in total net capacity expansion in 2023

IRENA's renewable energy statistics can be downloaded at: www.irena.org/Data

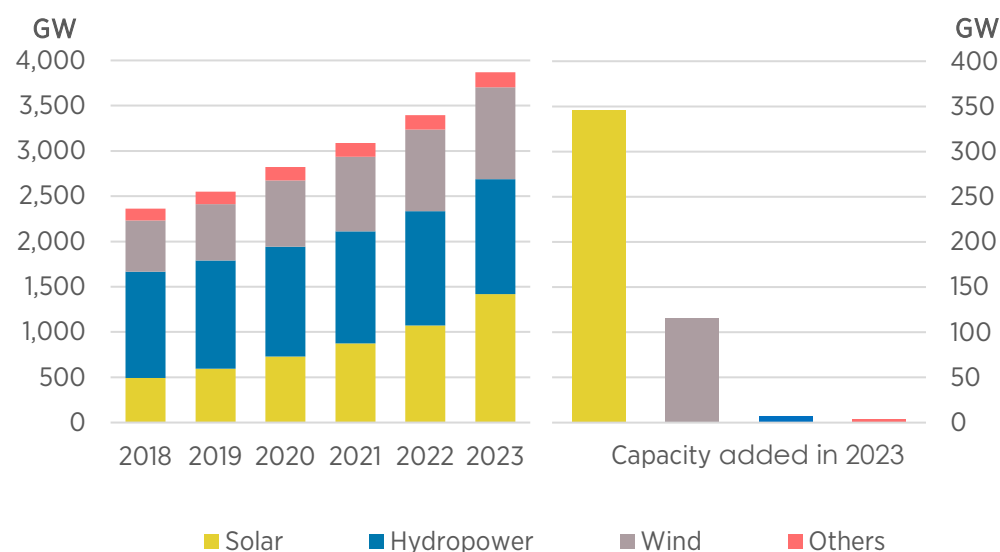
Renewable power capacity by energy source



At the end of 2023, global renewable power capacity amounted to 3 870 GW. Solar accounted for the largest share of the global total, with a capacity of 1 419 GW.

Renewable hydropower* and wind energy accounted for most of the remainder, with total capacities of 1 268 GW and 1 017 GW respectively. Other renewable capacities included 150 GW of bioenergy and 15 GW of geothermal, plus 0.5 GW of marine energy.

Renewable power capacity growth

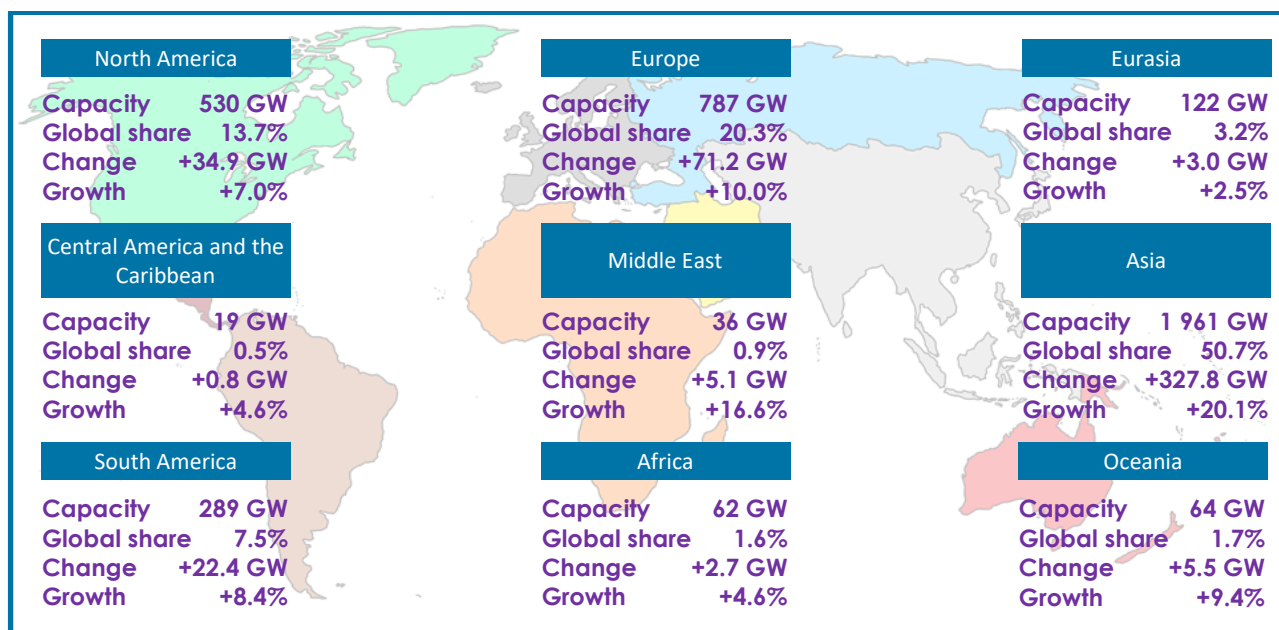


Renewable power capacity increased by 473 GW (+13.9%) in 2023. Solar energy continued to lead capacity expansion, with a massive increase of 346 GW (+32.2%), followed by wind energy with 116 GW (+12.9%). Renewable hydropower capacity increased by 7.0 GW (+0.6%) and bioenergy by 4.4 GW (+3.0%). Geothermal energy increased by a very modest 0.2 GW.

Solar and wind energy continued to dominate renewable capacity expansion, jointly accounting for 97.6% of all net renewable additions in 2023. This growth in wind and solar led to the highest annual increase in renewable generating capacity as well as the highest growth on record in percentage terms.

* Note: these figures exclude pure pumped storage hydropower. At end-2023, this was an additional 140 GW, giving a total hydropower capacity of 1 408 GW.

Renewable power capacity by region



For the complete dataset see: IRENA (2024) Renewable capacity statistics 2024, available at: www.irena.org/Data/Statistical-publications/Yearbooks

Asia again accounted for the majority of new capacity in 2023 (69.3%), increasing its renewable capacity by 327.8 GW to reach 1 961GW (50.7% of the global total). The majority of this increase occurred in China (+297.6 GW). Capacity in Europe and North America expanded by 71.2 GW (+10.0%) and 34.9 GW (+7.0%) respectively. Africa continued to grow steadily with an increase of 2.7 GW (+4.6%). Oceania's installed capacity increased by 5.5 GW (+9.4%), largely due to Australia, and South America continued on an upward trend, with a capacity expansion of 22.4 GW (+8.4%). The Middle East also recorded its highest expansion on record, with 5.1 GW of new capacity commissioned in 2023 (+16.6%).

Renewable power capacity for G7 and G20 Countries

G7	G20
Capacity 980 GW	Capacity 3 084 GW
Global share 25.3%	Global share 79.7%
Change +69.4 GW	Change +412.6 GW
Growth +7.6%	Growth +15.0%

The G7 countries (excluding the EU) comprised 25.3% of the global capacity share with a total of 980 GW. The G20 countries (excluding the EU and AU) account for 79.7% of the global share with a total capacity of 3 084 GW. The G7 and G20 countries respectively account for 14.7% and 87.2% of new capacity in 2023.

Highlights by technology



Solar energy: Solar photovoltaic power accounted for almost all the increase in solar power in 2023, with an increase in solar PV of 345.5 GW and an increase of 0.3 GW in concentrated solar power.

Expansion in Asia was 237.7 GW in 2023 (compared to +110.7 GW in 2022). 91.2% of the expansion occurred in China (+216.9 GW) and India (+9.7 GW). Japan also added 4.0 GW, a slight decrease compared to 2022 values.

Outside Asia, the United States added 24.8 GW of solar capacity in 2023, Germany and Brazil added 14.3 GW and 11.9 GW respectively.



Hydropower: Renewable hydropower expanded at a lower level in recent years with an increase in capacity of 7 GW. The largest capacity increase occurred in China. Other countries where capacity increased by more than 0.5 GW were: Australia, Nigeria, and Colombia.



Wind energy: With an increase of 116.0 GW in 2023, growth in wind power has seen its biggest increase in the past decade. China accounted for almost two-third of this expansion (+75.9 GW) and capacity in the United States increased by 6.3 GW. Most of the remaining capacity expansion occurred in Brazil, India, Canada and a handful of European countries. Offshore wind accounted for about 1.9% of total renewable power capacity and 7.1% of total wind capacity.



Bioenergy: Bioenergy capacity expansion slowed down in 2023 (+4.4 GW compared to +6.4 GW in 2022). Bioenergy capacity in China increased by 1.9 GW and other countries with major increases were Japan (+1.0 GW), Brazil (+0.4 GW) and Uruguay (+0.3 GW).



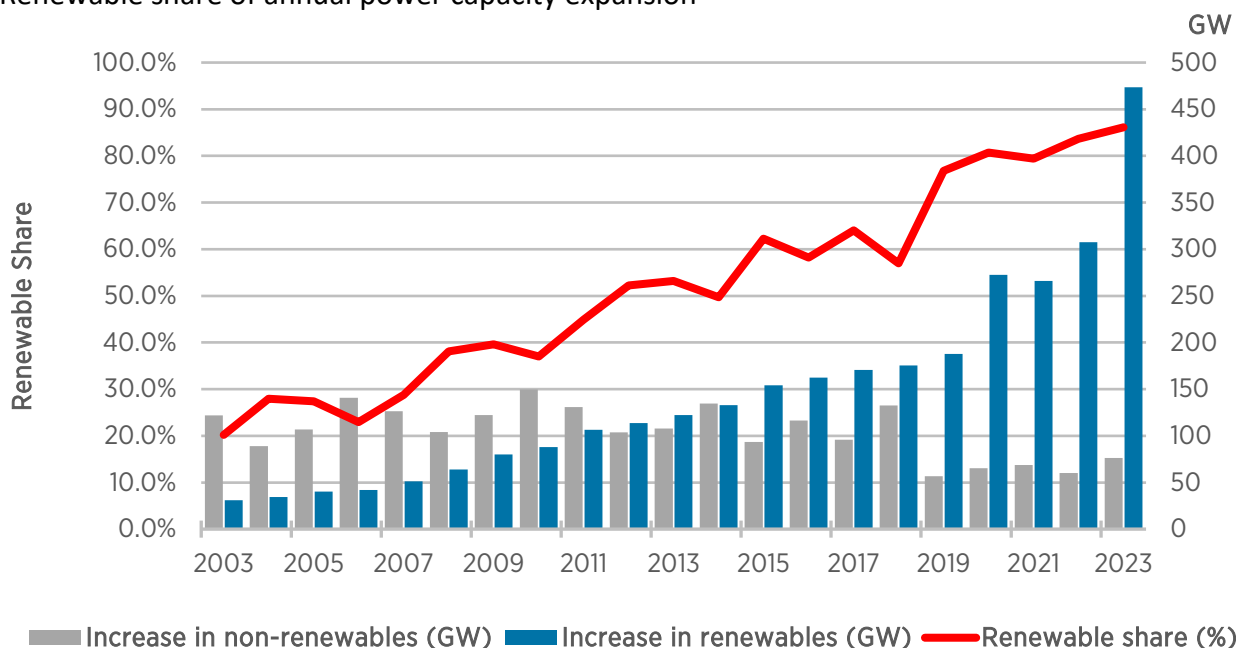
Geothermal energy: Geothermal capacity increased marginally in 2023, with most of this expansion occurring in Indonesia (+58 MW), Kenya (+35 MW) and Chile (+32 MW).



Off-grid electricity: Off-grid capacity* grew by 0.6 GW in 2023 (+4.6%) to reach 12.7 GW. Solar expanded by 0.4 GW to reach 5.0 GW, off-grid hydro capacity remained about the same as in 2022 with the remainder of this increase came from expansion of a broad range of different types of bioenergy.

* Note: these figures exclude Eurasia, Europe and North America.

Renewable share of annual power capacity expansion



In 2023, renewable power capacity expansion increased compared to 2022 and stayed well above the long-term trend. As in previous years, most of this expansion occurred in China and, to a lesser extent, the United States. However, most other countries also increased their expansion of renewable capacity in 2023 compared to 2022.

The share of renewables in total capacity expansion reached 86% in 2023, compared to the figure of 84% in 2022. The renewable share of total power capacity also rose by almost three percentage points from 40.4% in 2022 to 43.2% in 2023.

The upward trend in these shares continues to show both the rapid and increasing growth in the use of renewables and the declining expansion of non-renewable capacity. At the global level, the latter is partly due to the large amount of net decommissioning that has occurred for many years in some regions. However, more still needs to be done to achieve the goal adopted at COP28 to triple installed renewable power capacity by 2030 to reach 11 TW.

Latest figures compared to previous estimates

Compared to the capacity statistics published in July 2023, the figures here have been revised upwards slightly. Total renewable capacity in 2022 was reported as 3 381 GW last year and the new figure for 2022 is 3 396 GW (+0.44%).

As noted in previous years, most revisions can be explained by imprecise early reporting of capacity and the unavailability of data to the year-end in some cases, so it may be expected that these figures could be revised upwards in June 2024.